ABSTRACT OF THE DISCLOSURE

Improved aerodynamically light particles for vaccine delivery to the pulmonary system, and methods for their synthesis and administration are provided. In a preferred embodiment, the aerodynamically light vaccines are made of a biodegradable material and have a tap density less than 0.4 g/ml and a mass mean diameter between 5 μm and 30 μm. The particles may be formed of biodegradable materials such as biodegradable polymers. For example, the particles may be formed of a functionalized polyester graft copolymer consisting of a linear .alpha.-hydroxy-acid polyester backbone having at least one amino acid group incorporated therein and at least one poly(amino acid) side chain extending from an amino acid group in the polyester backbone. In one embodiment, aerodynamically light vaccine particles having a large mean diameter, for example greater than 5 μm, can be used for enhanced delivery of a vaccine agent to the alveolar region of the lung. The aerodynamically light vaccine particles incorporating an immunizing agent may be effectively aerosolized for administration to the respiratory tract to permit systemic or local delivery of wide variety of immunizing agents.